Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Laboratory for Energy Conversion

adlyte

Development of LPP Source Technology

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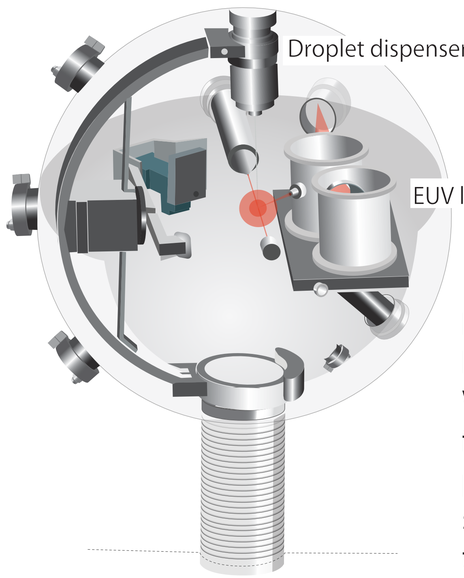
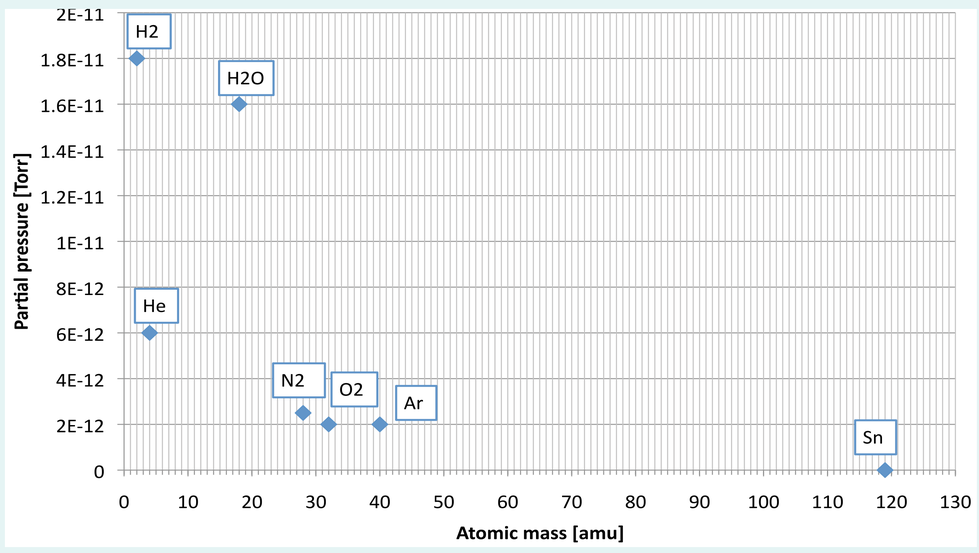


ETH Zurich/ LEC are developing a reliable, cost-effective and high brightness EUV source for metrology applications and for High Volume Manufacturing Litho application. The EUV target is a high frequency pure tin droplet combined with an industry proven high power Nd:YAG laser which can deliver up to 1.6 kW of power at short pulse. A state-of-the-art debris mitigation system protects the EUV light tube.

Laser System

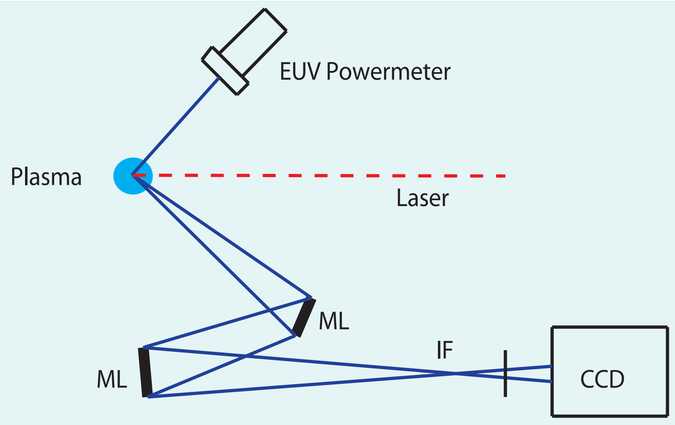
Nd:YAG laser with high power DPSSL. Power up to 1.6kW. Pulse length 20ns. Repetition rate up to 20kHz.

RGA measurements - No tin after IF



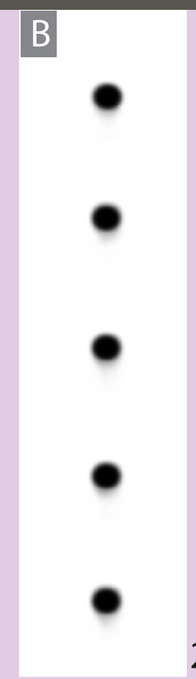
EUV light tube debris mitigation & contamination at IF. The debris mitigation successfully shields the ML mirrors from the tin plasma. No contamination is found at IF.

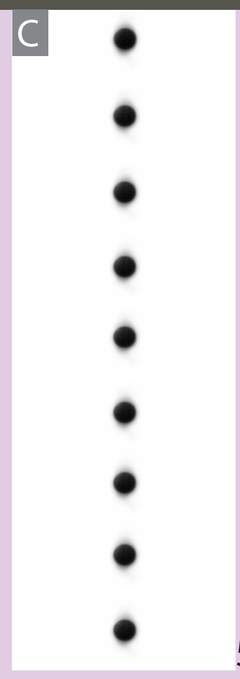
EUV light tube



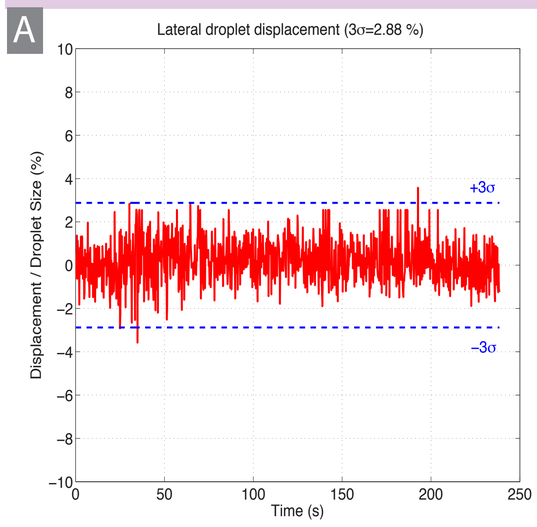
EUV light tube layout. Plasma is imaged and brightness is assessed using two ML mirrors and a CCD. The EUV powermeter also measures the EUV emission. More details on "SO-P04 EUV brightness measurements and IF imaging", Andrea Z. Giovannini, Oran Morris, Ian Henderson, Reza S. Abhari

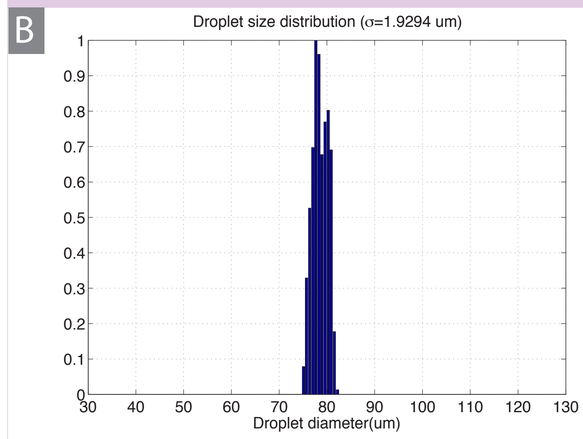
Droplet Dispenser





(A) Thermally managed droplet dispenser, integrated in beam delivery and EUV collection module. Fuel material is pure tin.
(B) Typical tin droplet train (20kHz, 35µm nozzle). Single droplet exposure. Image recorded using Xe flash and macroscope in vacuum.
(C) Typical tin droplet train (50kHz, 35µm nozzle)..





(A) Lateral droplet to droplet temporal stability for 35µm nozzle, operated at 20kHz.
Relative lateral motion of the droplets is limited to +/- 2.88%.

(B) Droplet size distribution for 35µm nozzle. The standard deviation of the size distribution is 1.9µm. The amount of fuel, delivered to the irradiation site is sufficiently controlled to fulfill the overall source stability requirements.

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